



**SNS College of Technology(Autonomous)
Coimbatore-35
Academic Year 2023 – 2024 (Even)**



UNIT 1 QUANTITATIVE ABILITY III

T3: Direct and inverse proportions.

Introduction

Logarithm is an important topic that needs to be prepared well for the Quantitative Aptitude. It requires practicing a lot of questions within time. Logarithmic formulas make it easy to solve questions easily in competitive examinations. The following article covers the concepts, formulas, and rules that a learner needs to know before approaching the questions.

Logarithmic function is inverse to the exponential function. A logarithm to the base b is the power to which b must be raised to produce a given number. For example, is equal to the power to which 2 must be raised in order to produce 8. Clearly, $2^3 = 8$ so $\log_2 8 = 3$. In general, for $b > 0$ and b not equal to 1.

Suppose x and y are in inverse proportion. If $y = 12$ then $x = 4$, find the value of y when $x = 8$.

Solution:

Given, x and y are in inverse proportion.

$$x \propto 1/y$$

$$4 = k/12 \text{ (where } k \text{ is a constant)}$$

$$k = 4 \times 12 = 48$$

Also, given that, $x = 8$

$$x = k/y$$

$$\Rightarrow 8 = 48/y$$

$$\Rightarrow y = 48/8$$

$$\Rightarrow y = 6$$

Thus, the value of y is 6 when $x = 8$.

The variable x is inversely proportional to y . If x increases by $m\%$, then by what percent will y decrease?

Solution:

By the definition of inverse proportion, two quantities, x and y , are said to be inversely proportional if a decrease in x causes a proportional increase in y and vice-versa.

If the variable x is inversely proportional to y , then $xy = k(\text{constant})$.

Thus, if x increases by $m\%$, then y decreases by $m\%$.

If two cardboard boxes occupy 500 cubic centimetres of space, then how much space is required to keep 200 such boxes?

Solution:

Given,

2 cardboard boxes occupy 500 cubic centimetres.

Space required for 200 boxes = ?

As the number of boxes increases, the space required to keep them increases, so this is a case of direct proportion.

Let x cubic centimetres be the required space.

So, $2/500 = 200/x$

$$2x = 200 \times 500 \quad x = (200 \times 500)/2 = 50,000$$

Therefore, the required space is 50,000 cubic centimetres.

If 35 men can finish a piece of work in 8 days, in how many days can 20 men complete the same work?

Solution:

Given

35 men can finish a piece of work in 8 days.

1 man can finish the work in (35×8) days.

That means less men and more days.

Here, we can see the inverse proportion between men and the amount of work done.

20 men can complete the work in $(35 \times 8)/20$ days = 14 days

Therefore, 20 men can finish the same work in 14 days.

If 270 kg of corn would feed 42 horses for 21 days, for how many days would 360 kg of corn feed 21 horses?

Solution:

Given

270 kg of corn would feed 42 horses for 21 days.

We have to find the number of days it would take to feed 360 kg of corn to 21 horses.

As we know, $N_1D_1/W_1 = N_2D_2/W_2$

where N = Number of horses

D = Number of days

W = Amount of corn

From the given,

$N_1 = 42$, $D_1 = 21$, $W_1 = 270$ kg

$N_2 = 21$, $W_2 = 360$ kg and $D_2 = ?$

$\therefore (42 \times 21)/270 = (21 \times D_2)/360$

$\Rightarrow D_2 = (42 \times 21 \times 360)/(270 \times 21)$

= 56

Therefore, the number of days taken to feed 360 kg of corn to 21 horses is 56 days.

I varies directly as m, and I is equal to 5 when $m = 2/3$. Find I when $m = 16/3$.

Solution:

If I varies directly as m.

$$I \propto m$$

$$I/m = k \dots (i)$$

$$I/m = 5/(2/3)$$
$$= 15/2$$

That means $k = 15/2$

Now, $m = 16/3$

Substituting $m = 16/3$ and $k = 15/2$ in equation (i), we get;

$$I/(16/3) = 15/2$$

$$3I/16 = 15/2$$

$$I = (15/2) \times (16/3)$$

$$= 5 \times 8$$

$$= 40$$

Therefore, $I = 40$ when $m = 16/3$.

If a box of sweets is divided among 24 children, they will get 5 sweets each. How many would each get if the number of children is reduced by 4?

Solution:

Given that a box of sweets was distributed among 24 children.

The number of sweets that can be given to each child = 5

Total number of sweets = $24 \times 5 = 120$ sweets.

If the number of children is reduced by 4, then the remaining number of children = $24 - 4 = 20$

Here, the number of children is reduced and the number of sweets for each child will be reduced.

Thus, both are in inverse proportion.

Hence, the number of sweets that can be given to each child = $120/20 = 6$

A worker is paid Rs. 225 for 9 days of work. If he works for 22 days, how much will he get?

Solution:

Given,

Amount paid for 9 days of work = Rs. 225

Let x be the amount to be paid to the worker for 22 days.

Here, the amount to be paid for 22 days will be more than the amount paid for 9 days.

That means both are in direct proportion.

$$\text{So, } 9/225 = 22/x$$

$$x = (22 \times 225)/9$$

$$x = 22 \times 25 = 550$$

Therefore, the worker gets Rs. 550 for 22 working days.